great number of cylinders would have the same effect nearly, as if about half the above mentioned excess of weight always acted at the extremity of the horizontal radius of the wheel; and according as the number of cylinders was great or small it would approximate one of those extremes. This is but a rough calculation of the powers of this engine, but it may suffice as well to give an idea of it to most of our readers, as one of more mathematical precision.

Very little more momentum would be lost in this engine, than what was consumed in the motion of the weighted pistons to and from the centre of the wheel, above the reduction of this, which could be effected by the well known mode of regulating the admission of the steam invented by Mr Watt.

The chief point of comparison in steam engines is, which will have most power for the least consumption of fuel; the next is, which will be cheapest in first cost and repairs, for equal powers. To the *first point*, Mr. Witty does not state that his engine has any superior pretensions, nor are any apparent: and those which he states it has to the second, can only be proved by comparing the prices of his engines with those on the common repercussive principle, of equal efficacy.

The figures of Mr. Witty's engines may be seen in the Repertory of Arts, XVII. 130 *pl.* 8.

Patent of Mr. William Docksey of Bristol, Millwright, for improvements in the process for manufacturing ivory black, and for pulverizing all articles, in which this operation is facilitated by torrefaction, or calcination, especially potter's clay, flints, colouring, and glazing materials.

Mr. Dockey's method of preparing ivory black, and the other articles mentioned in the title, consists in manufacturing them *with a very small quantity of water*, in grinding or reducing them to powder: by which much labour is saved and the stoves for evaporating the water, used in the processes now practised, are rendered unnecessary, and which processes of drying injured the colour of ivory black. The patentee describes his method of making ivory black as follows.

"To manufacture ivory black, I take the bones and sloughs of the horns of animals, and calcine them to blackness, in close or air tight vessels. I then crush them in their dry state, between metal rollers of about two feet diameter, until they are broken sufficiently small to pass through a hopper into the eye of a millstone, and be reduced to powder between millstones, in an horizontal position, exactly similar to the method of reducing or grinding corn to flour. By a like process the powder thus obtained is then partly passed through a dressing machine constructed with brushes and fine iron and brass wire, upon a circular frame inclosed within a rim, which receives it. *Such part as passes through the meshes* of the wire (which should be about 68 to an inch) is sufficiently fine for use, and is damped down by a small quantity of water sprinkled upon it, and packed for sale;—the coarser part is returned to the hopper, and ground over again between the stones."

With respect to the flints, potter's clay, and colour and glazing materials, Mr. Docksey states his method is to take the calcined flint, dry clay, calcined lead, lead ore, manganese, or other article of this nature, and pass it under stampers, or heavy hammers to break it sufficiently small to pass between metal rollers; where it is crushed so fine as to be reduced to a pulverulent state: it is then ground in its dry state, between mill stones, in a manner similar to that before described for manufacturing ivory black. It is then passed through a dressing machine (inclosed within a very tight and close bin which receives it) the coarser parts being thus separated, the finer parts are then mixed with water in a tub or deep vessel. The coarser parts are farther separated by subsidence, and the finer parts passed through a fine lawn or cypress sieve: the water is then drained off, and evaporated by heat from the substance.

Observations....There is not sufficient novelty in any of the above processes, to render this patent of any apparent use to its owner, except that of having the name of selling a patent article.

Account of the method proposed by Colonel Caulfield Lennox, of constructing, and putting in its place an Iron Tunnel under the River Thames.
Phil. Mag. xxxvi. 34.

Colonel Lennox proposes that the Tunnel shall be cast in portions of its length of ten feet each, which in the figure annexed to his paper, resembles an arched gate-way, eighteen feet broad, twelve feet high at the sides, and ten feet long, with a convex top rising two feet in the middle. They are to be made of cast iron, four inches thick at the bottom and sides, and three at the top, with double flanches inside and outside, one foot broad, and four inches thick; each frame the colonel calculates, will weigh forty tons.

Those frames or portions, are to be united to each other, by screws four inches diameter, and nuts of a proportional size; and to have sheet lead half an inch thick put between the flanches, or the joints secured with the cement employed by steam engine builders. Cramps are also mentioned for connecting the two adjoining flanches at bottom, but no farther description of them is given but that they are each to be twelve inches broad, six inches thick, and two feet high.

Tubes of eight inches bore, with openings to receive leakage water, are to be cast in the angles at the bottoms of the frames, by which the whole is to be kept dry, with a properly constructed pump.

The colonel proposes that eighty of these frames shall be screwed together, with half inch lead between the flanches, with their two extremities close stopped with strong oak plank, on the side of the river rather below the level of low water, in a situation where the tide may have free access; and that (a level bed having been previously excavated for this tunnel, across the bottom of the river, sixteen feet deep, and from 60 to 80 feet wide) the whole be floated to the required situation, at spring tide, and sunk in its proper place, either by additional weights applied, or by admitting a certain quantity of water into it, and asserts that, in case of any irregularity in its descent, or unevenness in the bed prepared to receive it, *it will again become buoyant by removing the additional weights*, or by pumping out the water by pumps previously secured in each end frame.

Calculation of the weight of this tunnel in round numbers.

	Cubic Feet		Tons.
Cast iron, ...	20.020	about	4270
Lead, ...	566	. . . . .	178
Oak, ...	200	. . . . .	5
			4.453
Water displaced,	1.850.000 cubic feet		5.163
This tunnel will require to sink it more than			709
Exclusive of the convexity at top, estimated at			60
			769

The following is the manner proposed of sinking this machine by the additional weights.

Two short ropes with loops at each end, are to be passed over each frame, and slightly secured in their places; and when the machine is floated to its destined situation (which should be an hour before low water at the lowest tide) anchors and cables being in readiness to secure it in its place, then a number of boats (suppose 160) shall attend half on one side, and half on the other, each with five tons of ballast conveniently disposed so as immediately to hook on to the ends of the short ropes before mentioned, in such a manner that one end of the tunnel shall not sink before the other, but both exactly together. These weights may be so regulated as occasion may require, should there appear any irregularity in its descent; and when it is placed as desired and the water admitted to fill it, they may be removed altogether. The whole of this operation might be effected in two hours, that preceding, and that following ebb tide, if every previous arrangement was properly made. The machine consisting of 80 frames of the length mentioned, would extend